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Fruit-drying, a Representative Rural Industry.

A FEW weeks ago the London correspondent of one of our daily papers gave what he called "a striking illustration of the lack of resource of the British farmer, of whose woes so much has been heard." He went on to say that there had been such a glut of plums in England this year that the price of the best fruit fell to twopence a pound, which did not pay the cost of gathering and marketing, and, therefore, the growers sat down and allowed the fruit to fall and rot. If, instead of this, they had bustled around and dried the fruit they could have had sixpence a pound in a month or two and no fear of a glutted market, since England pays annually two and a quarter millions of dollars for dried plums imported mainly from France.

It is, no doubt, true that if glutted markets were ordinary experiences with British plum-growers they ought to have prepared themselves to face such a probable danger. If, however, this state of things was altogether exceptional, it is unjust to accuse them of lack of forethought and energy because "they did not bustle around and dry their fruit," for, without the proper machinery and the skill which comes from practice, it would have been utterly impossible to dry a large crop of plums in such a way that they would be attractive, palatable and salable. It is very easy for newspaper critics to advise farmers to take up some new branch of agriculture when an old one fails, but the critic hardly realizes how much time and thought are necessary when the entire economy of a farm is to be readjusted. When there is an overplus of milk in the city and farmers are losing money on this product, it is quite easy to advise them to make butter, but this means a revolution in the entire system of farm practice, and it implies the work of years and the building up of a new plant by men who have no capital. In the same way, whenever grain farming or dairy farming becomes unprofitable, the farmer is counseled to raise fruit—that is, to learn a new trade and build up a new business—and if he is not prepared to do this on sight, he is reproached for his sluggishness just as the critic from whom we have quoted sneers at the "ridiculous conservatism" of the English farmer who wasn't ready with evaporators of the latest pattern to turn his plums into dried prunes at a moment's warning.

How to dispose of surplus fruit in times of abundance is, nevertheless, a serious problem, since it is hard to transport on account of its perishable nature, and still more difficult to keep in eatable condition. It is plain, therefore, that if it can be converted into such a form that it will endure shipping to any part of the world and will keep all the year round, the market for it is practically unlimited. The fundamental problem is how to prepare the fruit in such a way that its palatable and nutritious qualities can be preserved in the cheapest way possible. The canned-fruit industry is an enormous one, but the demand for this product does not increase as rapidly as the demand for dried fruit, principally because the former is much more expensive. Dried fruit sells at about half the price a pound that canned fruit commands, and yet the material in one pound of dried fruit will make six pounds of canned fruit; that is, the fruit itself, when canned, not counting the syrup, costs twelve times as much as the same amount costs when dried. Another reason for the increasing demand for dried fruit is that when cured by the best modern processes it is much superior to what it once was. In California they have learned to prepare prunes so well that large quantities of them are shipped to France, the home of the prune; dried apricots and pears go to Europe by the thousand pounds, while California raisins have practically driven foreign raisins out of eastern markets in this country, and are now exported in considerable quantities. Statistics are not difficult to obtain, but one needs a vivid imagination to interpret the dry figures in such a way that an adequate appreciation of the importance of this industry is secured. But when we think of three million pounds of prunes sent out from the single city of San José in one month, we gain some idea of the magnitude of the business, and we also get an idea of its rapid growth when we recall the fact that eight years ago this city did not take a car-load of dried apricots in a year, while now it eagerly swallows up two hundred car-loads.

But the prunes and apricots and peaches and plums and pears and raisins which are sent out from California by the train-load by no means complete the full supply of dried fruit that is produced in this country. Bulletin 100, which has just been issued by the Cornell Experiment Station, gives an account of the production of one kind of dried fruit in western New York, and from this we learn that a thousand tons of evaporated raspberries are produced in Wayne County alone. Something like five hundred tons more are marketed from neighboring counties, and yet if the visitor should inquire for dried raspberries at any of the retail stores throughout that region he would hardly find a pound. Where, then, do these berries go? Probably four-fifths of them are consumed in lumber and mining camps of the west and on the plains, where fresh fruit is scarce. Very few of them are exported, and yet in cookery—that is, for use in pies, puddings and the like—these dried berries are nearly as good as the fresh ones. It ought to be added that raspberries are also dried to an important extent in southern Illinois and in Michigan, and more recently in Arkansas.

This bulletin gives an interesting history of commercial fruit evaporation in Wayne County, where, in apple-growing communities, nearly every farm has an evaporator of one kind or another, more than two thousand of these machines being in use in this one county. It ought to be remembered that, great as is the product of dried raspberries in western New York, there are more apples dried than raspberries, and after these in their order come peaches, pears, quinces, plums, cherries, currants, potatoes, peas, corn and pumpkins. This great business has grown up within twenty-five years. One little drying machine was introduced there in 1867 by A. D. Shepley, and the right to use it was bought by Mason L. Rogers, who in 1868 planted five acres of black raspberries, with the expectation of drying the fruit. The modern industry and the use of the word "evaporator" did not begin, however, until Charles Alden patented the tower evaporator in 1870. The

original Shepley machine was only capable of drying three bushels of apples in ten hours. Now one of the establishments described in this Bulletin will evaporate three hundred bushels of apples a day, and another one has a capacity of five thousand quarts of berries a day.

It is not our purpose here to describe the various methods of making trays and moving them, or to explain the process of kiln drying, tower drying, steam drying, vacuum drying or air-blast drying with the various elaborate devices prepared to lighten every possible item of labor. We only use this as an illustration to show that it has taken years of experiment and expense to develop this business into its present form, and that even now considerable capital is required and great attention must be given to the plans of building, machinery, storage-rooms, etc., if the business is to be made profitable. The sum of the whole matter is this. Bonanza farmers who sow wheat by the square mile can afford to sell grain at a few cents' profit on a bushel, just as a large manufacturer is satisfied with a small margin of profit because of the enormous amount of his production. Under the growing stress of competition ordinary farmers cannot live on staple products at wholesale prices. But the farmer, to make something beyond wholesale prices, must put special intelligence into his work. He cannot live as his father did on industry and frugality alone. He must be prepared to meet some special want with a special crop, or he must add to one profit as a grower, another profit as a manufacturer by turning his grapes into wine and his plums into prunes, or he must in some way use the machinery of his farm so that it will make something to sell besides the raw material which grows on his acres. This means that he must know more and apply his knowledge to better advantage. After twenty-five years of study and experience the farmers of Wayne County can make a profit with the most approved appliances after they have secured a good crop, and to secure a good crop constant and intelligent care must be exercised from the time the ground is prepared for the young plants until the manufactured product is put on the market in the most attractive form. The farmers of this country as a class are better husbandmen than their predecessors ever were, but they must have a still more thorough education for their work if they are to maintain the commanding position which the great body of tillers of the soil once held in the political and social economy of the country.

James Buckman and Plant Variation.

PROFESSOR BAILEY is in the habit of making five-minute talks before his class in Evolution, and one of his students sends the following transcription from her notes of one of these addresses as worthy of permanent record:

James Buckman was Professor of Agriculture in the Royal Agricultural College of Cirencester, England. He was born in 1816, and died in 1884. In 1863 he left the chair of agriculture in the Royal Agricultural College to go to his farm in the Downs region, where, during the remainder of his life, he was very successful as a farmer, and also wrote a number of books on geology, botany and the like.

A few years ago, while passing along the streets of Lansing, Michigan, where I then lived, I was attracted by a pile of old books which a dealer said he had just received from New York City. Upon looking them over I was surprised to find a small record-book which was written full of an essay upon the "Botany of the Cabbage and the Ruta Baga," and signed by James Buckman. Moreover, I found an entry in the front part of the book to the effect that the essay had been awarded the prize upon the 15th of December, 1852. Just what this prize was I do not know, and I am not able to find any record that the essay was published. It is very likely that it was written in competition for one of the prizes which it was the habit of the Royal Agricultural Society to offer. It is strange how the manuscript ever left Professor Buckman's hands, and stranger still that it should have wandered across the ocean and finally reached my own library.

But there is still greater interest attaching to this essay. I have been telling you for the past few days that Thomas Andrew Knight, Alexander Braun and Charles Darwin believed that the chief factor in the variation of plants is the augmentation of food-supply; and here I find in this manuscript essay of Buckman's another statement of the same belief, showing that still another observer had arrived independently at the same conclusions. The essay, bear in mind, was written before the appearance of any of Darwin's philosophical writings, and the statement lacks the exactness of later philosophical discussions; yet it is interesting as showing the man's independent belief. The following sentences indicate his philosophy:

"This laying on of cellular tissue is very analogous to the laying on of fat in animals; in a state of nature no animal (except the hybernating ones) carries fat. Plethora is, in fact, a disease, and so it may be termed in the case of plants. A climate and soil well suited to their health, with good food in the shape of plentiful manure of the right description, causes them to grow fat, and by selecting those plants that appear to have the inclination to develop this cellular tissue on any particular structure, and using their seed in soil of the same description, the peculiarity is propagated."

An Interesting Experiment in Tree Culture.

WHEN in Holland last summer I spent a day in the latter part of July, at the request of Professor Sargent, in visiting the Pinetum Schoberianum, or plantations of coniferous trees belonging to Mr. J. H. Schober, on his estate called Schovenhorst, in the town of Putten, some thirty miles north-east of Utrecht. These plantations are very extensive, some six hundred acres, if I remember correctly, being devoted to them, and they contain probably the largest and most complete collection of conifers from all parts of the world, except, of course, the intensely tropical regions, that has ever been brought together. Mr. Edward Downes, the accomplished United States Consul at Amsterdam, accompanied me, and Mr. Schober himself was there to conduct us through the woods and fields. A more charming and intelligent gentleman it would be difficult to find; and, although light showers were frequent during the day, according to the summer practice of Holland, and our host was long past seventy, he led us about with a vigor, energy and enthusiasm which formed the envy of the younger men of the party.

Mr. Schober is a wealthy lawyer of Utrecht, and, like the wise man he is, he has long cherished a passion for the cultivation of trees; and this passion he has directed toward a most practical and patriotic object. In Holland there is a great extent of land that in former ages formed the seashore; and in these dunes the soil remains worthless for agricultural purposes. With whatever crop might be attempted, whether grain, grass or vegetables, the expense would be more than the product, and so the land is substantially left without culture; yet with coniferous trees the case is different. Hence the traveler frequently passes in Holland, as in other parts of Europe, plantations of Scotch or Austrian Pines occupying these sandy lands where nothing else of value could well be made to grow. These plantations cost little, require no care, and by the annual dropping of their needles tend to some improvement of the soil; while at the end of the proper period the firewood they furnish is a substantial thing and always finds a paying market.

In this situation Mr. Schober has struck out from the common course, and, instead of planting Pinus sylvestris and P. Austriaca, he has started to determine what trees are really best worth planting and cultivating in these sands; and for this purpose, as I have said, he seems to have ransacked the whole temperate zone in all the continents. But I cannot do better than to give his list as follows:

Abies amabilis.	Abies concolor.
" magnifica.	" firma (bifida).
" balsamea.	" Fraseri.
" brachyphylla.	" grandis.
" bracteata.	" Gordoniana.
" Cephalonica.	" Mariesii.
" var. Appollinis.	" nobilis.
" " Reginæ Amaliæ.	" Nordmanniana.
" Cilicica.	" " glauca.

Abies Numidica.
" pectinata.
" Pinsapo.
" " glauca.
" Sachalinensis.
" Sibirica.
" subalpina.
" Veitchii.
" umbellata.
" Eichleri.
Picea Ajanensis aurea.
" " alba.
" " cœrulea.
" Alcoquiana.
" Engelmanni.
" " glauca.
" " argentea.
" excelsa.
" " eremita.
" " Cranstoni.
" " aurea.
" " compacta nana.
" " " pyramidalis.
" excelsa compacta inverta.
" " " Remonti.
" " Finedonensis.
" Jezoensis.
" pungens.
" nigra.
" " doumetii.
" obovata.
" " Japonica.
" orientalis.
" polita.
" Schrenkiana.
" rubra.
" Khutrow.
" Morinda.
" orientalis aurea.
" acicularis.
" Omorika.
" Glehni.
" Dicksonii.
" Sitchensis.
Larix Europæa.
" Japonica.
" leptolepsis.
" microcarpa.
" Kæmpferi.
Cedrus Libani.
" Atlantica.
" Deodara.
Pinus Austriaca.
" contorta.
" densiflora.
" Laricio.
" " stricta.
" " Calabrica.
" Thunbergii.
" monophylla.
" Fremontiana.
" montana.
" uncinata.
" Pumilio.
" Pinaster.
" Brutia.
" Pyrenaica.
" sylvestris.
" resinosa.
" Jeffreyi.
" ponderosa.
" Benthamiana.
" rigida.
" serotina.
" mitis.
" Tœda.
" Cembra.
" " Sibirica.
" " pumila.
" Strobus.
" Koraiensis.
" Sabiniana.
" Balfouriana.
Pinus Balfouriana, var. aristata.
" muricata.
" Lambertiana.
" Bolanderi.
" Coulteri.
" maerscarpa.
" excelsa.
" Monticola.
" tuberculata.
" Peuces.
Sciadopitys verticillata.
Sequoia gigantea.
Cupressus intertexta.
" Lawsoniana.
" " " alba.
" Nutkaensis.
" thyoides.
Retinospora ericoides.
" obtusa.
" pisifera.
" squarrosa.
Thuya gigantea.
" occidentalis.
" " Hoveyi.
" " pendula.
" Japonica.
" Wareana.
" Vervæneana.
" Bodmeri.
" gigantea aurea.
" " Standishi.
" Spathi.
Thuiopsis dolabrata.
" " robusta.
Librocedrus decurrens.
Juniperus communis.
" Virginiana.
" " pendula.
" " variegata.
" " albo spica.
" " glauca.
" " aurea spica.
" Japonica aurea.
" Schotti.
" drupacea.
" elegans.
" cinerascens.
" sabina.
" communis aurea var.
" Oxycedrus.
" Chinensis.
" pyramidalis.
Tsuga Mertensiana.
" Brunoniana.
" Canadensis.
" Pattoniana.
" Sieboldii.
" Caroliniana.
Pseudotsuga Douglasii.
" pendula.
" argentea.
" glauca.
" Schovenhorst seedling.
Athrotaxis Doniana.
" laxifolia.
" selaginoides.
Araucaria imbricata.
Cryptomeria Japonica.
" " argentea.
" " falcata.
" " variegata.
" " compacta.
" " elegans.
Taxus baccata.
" " pendula aurea.
" " pyramidalis.
" cuspidata.
Widdringtonia cupressoides.
Cephalotaxus Fortunei.
Torreya Myristica.
" Californica.
Biota Japonica filiformis erecta.
Cunninghamia Sinensis.

In one of his pamphlets Mr. Schober furnishes an interesting catalogue of plants that are not *winterhaard*, and were much injured or entirely killed by the winter of 1881:

Abies bifida.
" firma.
" Pindrow.
" acutissima.
" Japonica.
Araucaria imbricata.
Arthrotaxis selaginoides.
" cupressioides.
" Guineana.
Biota orientalis.
Cephalotaxus pedunculata.
" Fortunei.
Cephalotaxus drupacea.
Different varieties of Cupressus.
Frenela australis.
Pinus densiflora.
" Fremontiana.
" ovatia.
Sequoia sempervirens.
Torreya nucifera.
" myristica.
" grandis.

There are several separate plantations of these trees at Schovenhorst, and no two of them seem to be of precisely the same age. The first planting dates back to 1848. The rule universally observed in groves of Scotch Pines, of putting the trees in straight lines at very small distances from each other (from three to six feet apart), has been adhered to by Mr. Schober. This close planting forces the growth upward, and leaves no room for lateral expansion, except where an extra-vigorous tree crowds away its neighbor and seizes the space for itself. Every two or three years the trees are measured and the measurements recorded. The circumference of each tree is taken at one metre above the ground, and its total height in metres is put down, showing how much it has grown since the last previous measurement. According to the measurements recorded for 1892, the tallest tree, an Abies pectinata, had then reached the height of nineteen metres, or sixty-two feet four inches, and its circumference was 1.25 metres, or four feet and one and a quarter inches. Next to this was a Pseudotsuga Douglasii of 18.50 metres height and 1.48 metres circumference. I saw no record of the later measurements.

But rapidity of growth and ability to resist the climate do not constitute the final test. The last point of all to be determined will be the quality of the wood. For this purpose trees of each kind will be cut down, and when the specimens of the wood are dried, they will be scientifically examined to determine their strength, their power of resistance, their durability and their relative value as fuel. In order to arrive at this final solution of the problem which Mr. Schober has in view, it is his estimate that at least forty years more will be required; and, as he cannot expect to remain as long as that in this world, he proposes to hand the establishment over to the Dutch Government on its promising to take care of the plantations, and to see that the enterprise is carried to its full conclusion.

I was there too short a time to form any opinion as to the comparative prosperity of the different species of trees; yet it was impossible not to see that one of the most thrifty kinds was the Douglas Fir. That variety of the Picea pungens known as the Menziesii Parryana was likewise very vigorous and promising. I noticed also that none of the Pine family and none of the Tsugas seemed to be equal to those two in growth or beauty. Most of the Japanese conifers wore a discouraging appearance, except, perhaps, the Picea polita. But I left Schovenhorst with intense admiration for the zeal, the devotion, the scientific knowledge and the indomitable patience of its owner.

New York. *C. A. Dana.*

Entomological.

The Columbine Leaf-miner, Phytomyza Aquilegiæ.

BOTH last season and this all the Columbine-plants on our grounds were greatly injured and rendered very unsightly by the depredations of this small insect. The adult of this Phytomyza is a two-winged fly. It deposits the egg either on or inside of the leaf early in the season; this soon hatches, and the young larva at once begins mining inside the leaf. This year plants showed the attack

as early as the middle of May, and from that time until now (October 11th) nearly every leaf has shown indications of the presence of this insect, from which it may be inferred that there are probably several broods. Young seedlings of Aquilegia Canadensis were severely injured, and old plants of other species lost nearly all their leaves from these attacks. In some instances the soft tissue was entirely devoured, and nothing remained but the skeleton of the leaf.

The larva is a footless grub, and one-sixteenth of an inch long when full-grown. During the period of pupation it is fastened to the under side of the leaf. I have observed eight or ten pupæ hanging from a single leaf. As in all dipterous larvæ, the skin hardens at the last moulting, and becomes the covering of the puparium. It turns to a dark brown color and shortens slightly. Soon the adult emerges. Probably the insect hibernates in the pupal stage, though I am not aware that its life-history in this country has been

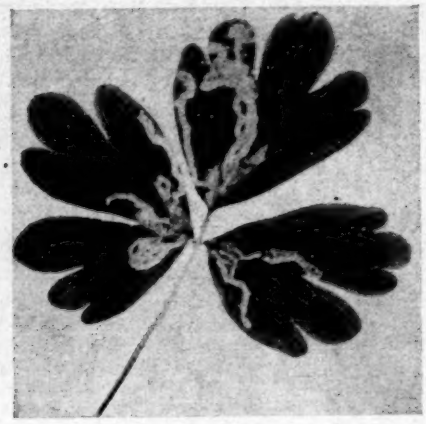

Fig. 61.—Leaf of Wild Columbine mined by Phytomyza Aquilegiæ.—See p. 443.

fully worked out. The accompanying figure shows a leaf of Aquilegia Canadensis containing mines made by this insect.

Probably we have no remedy against these attacks, for, since the insect is inside the leaf, it is out of the reach of all insecticides. The infested leaves can and should be destroyed. Our beautiful hardy Columbines will lose much of their attractiveness if the ravages of this leaf-miner become general.

Conn. Exp't Station, New Haven, Conn. *W. E. Britton.*

Foreign Correspondence.

London Letter.

Cirrhopetalum Rothschildianum.—This is remarkable for the large size of its flowers, which exceed in dimensions those of such species as the beautiful Cirrhopetalum Collettianum and C. robustum. It was shown last Tuesday, and obtained a first-class certificate. The pseudo-bulbs are angular, the leaves narrow and fleshy, and the scape bore three flowers which in outline suggest Masdevallia Chimæra, being an inch across the broadest part and six inches in length. The broad dorsal sepal is colored yellow and purple and is tipped with a plume-like appendage; the petals are fringed and of the same color; the sepals are long and tail-like, purple, with a few yellow markings, and the small lip is crimson. It will be seen that the general characters of the flowers are those of C. Collettianum, but they are larger and different in color. Nothing is known of this plant except that it was imported by Mr. O'Brien from some part of southern India.

Sobralia Lindeni.—A plant of this distinct new species was shown in flower this week by Mr. Lucas, of Horsham, and was awarded a certificate. It has shorter stems than Sobralia macrantha, and large flowers with the sepals and petals white, faintly tinged with rose, and the lip colored rich crimson-purple in front, paler toward the margin and streaked with chocolate-brown in the throat, the folded portion of the lip being white. Monsieur Linden claims for it the first position among garden Sobralias, and states that with him flowers were developed which measured ten inches in diameter and that the segments were snow-white. No doubt, the flowers will vary in shade in this as in other Sobralias, but, judged by the plant flowered by Mr. Lucas, it is a truly beautiful Orchid. It is most like S. Ruckeri in botanical characters. Imported plants of it were sold at auction for the first time in London by L'Horticulture Internationale in 1893.

Cattleya labiata, var. Cooksonæ.—We are likely to soon have as many named varieties of the autumn-flowering Cattleya, distinguished from all others of the group by the term Vera, as we have of Odontoglossum crispum. This new one, which was awarded a first-class certificate on Tuesday last, has large well-formed flowers with pure white sepals and petals, a long lip, the tubular portion of which is white, the throat purple and yellow, and the front lobe brilliant purple, with a white crisped margin. Three other varieties of Cattleya labiata received awards of merit at the same time.

Cattleya Mantini is a new hybrid between C. Dowiana and C. Bowringiana, which has been raised by Messrs. J. Veitch & Sons, and which obtained an award of merit last Tuesday. In general characters the flowers of the hybrid closely resemble C. Bowringiana, the only trace of the other parent being in the shortness of the tube and broad front lobe of the lip and in its colors, which are purple, with lines and veins of yellow and crimson.

Aristolochia clypeata.—Plants of this handsome tropical climber are now flowering at Kew for the first time. It is a native of Colombia (New Grenada), whence it was first introduced in 1868 by Monsieur Linden through the collector Wallis, but it does not appear to have become established in gardens then. Messrs. Sander & Co. have again introduced it, and until it flowered it was supposed to be Aristolochia gigantea, to which it bears a close resemblance. The Kew plants have corky stems and pale green, thin, cordate leaves three to six inches long, or a little larger than those of A. elegans. The flowers are borne on short racemes, which spring from the woody part of the stem; each flower is in form like A. elegans, but thicker in substance and about three times as large, the color being a rich velvety brown, with closely reticulating lines of pale yellow; above the ringed entrance to the tube there is a large blotch of blue purple which suggests the "eye" of a peacock's feather. The flowers have not a disagreeable odor. A figure of the plant will shortly be published in *The Botanical Magazine.*

Bauhinia Galpini.—This plant is now flowering for the first time at Kew. It was introduced from the Transvaal in 1891 by Mr. E. E. Galpin, who sent specimens of it to the Kew Herbarium, from which a description was made by Mr. N. E. Brown and published in *The Gardeners' Chronicle* for that year. At the same time Mr. Galpin sent seeds and recommended the plant as a handsome shrub likely to find favor with gardeners. At Kew it has grown into a somewhat loosely branched shrub six feet high, the branches nearly horizontal, the leaves light green, bilobed, two inches broad, deciduous if properly treated. The flowers are produced in short racemes near the top of the small branches, and they are campanulate in form, with five equal petals, colored bright crimson, in appearance suggesting the flowers of a common Nasturtium. The Kew plant is grown in a dry sunny house along with Agaves, etc. I should say this plant would be a success in the southern states.

Gynerium jubatum.—This is a beautiful Pampas Grass from the mountains of Ecuador, which was introduced into cultivation about twenty years ago, but, owing to its not being sufficiently hardy to grow out-of-doors in Eng-

land, except in such places as Cornwall, it has not found much favor. In Mr. Gumbleton's garden at Cork, however, it is perfectly happy in the open air, although his largest specimens were killed by twenty-nine degrees frost experienced last year. He calls it the most beautiful of all the Gyneriums known to him, and certainly the inflorescence he has lately sent to Kew proves it to be exceedingly ornamental, in plume at any rate. The feathery portion of the plume is thirty inches long, and the branches, which are from twelve to eighteen inches long, are equally distributed all around the axis, so that the plume when held erect is very graceful and regular. The flowers (spikelets) are very silky and gray, with a tinge of purple. The plumes are apparently as lasting as those of the common Pampas Grass, G. argenteum. Mr. Gumbleton says the plant is a surface rooter.

HYPERICUM MOSERIANUM TRICOLOR.—This is said to be a branch sport from Hypericum Moserianum, but it has none of the characters of that hybrid, and if its origin is as stated, it is a case of reversion to one of the parents, namely, H. patulum, plus a very pleasing variegation. The habit of the plant is like that of H. patulum, but more horizontal; the leaves are smaller, narrower and somewhat variable in form, the largest being an inch long and half an inch wide; they are colored pale green, cream-yellow and cerise. Messrs. Sander have a large stock of this plant, and I learn from them that it is quite hardy, and that when at its best in autumn it is quite as effective as Mrs. Pollock Geranium. The plant is easily propagated, and it appears to be permanently variegated. Messrs. Sander advise that the young plants should be grown on in a cold frame for a year and then planted out in a sunny position in June. The flowers

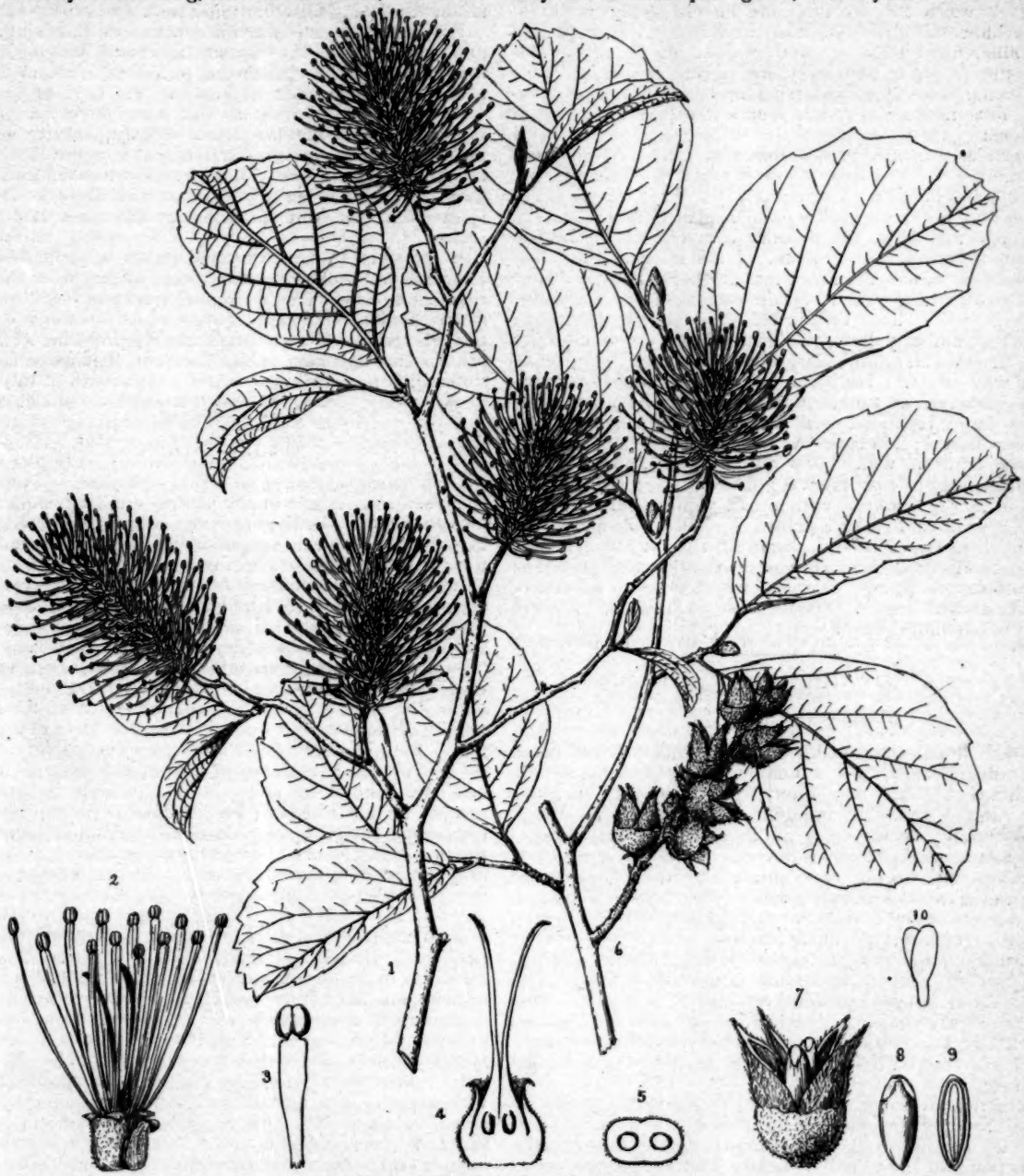

Fig. 62.—Fothergilla Gardeni.—See page 446.

1. A flowering branch, natural size. 2. A flower, enlarged. 3. A stamen, enlarged. 4. Vertical section of an ovary, enlarged. 5. Cross-section of an ovary, enlarged. 6. A fruiting branch, natural size. 7. A fruit with the valves laid open, enlarged. 8. A seed, enlarged. 9. Vertical section of a seed, enlarged. 10. An embryo, much magnified.

of this variety are only about one-quarter of the size of those of H. Moserianum, which has proved a tremendous success in beds at Kew this year.

Lespedeza Sieboldii.—This is one of the handsomest of the shrubby Leguminoseæ, which flower late in the autumn. It is grown in large beds in an exposed place on a lawn at Kew, where its elegant pendent branches form a Bamboo-like mass twelve feet through and four feet high, which is attractive before the flowers come in the latter part of September, when the branches are heavily laden with red-purple flowers. The shoots are annual, or at any rate they are killed down to the ground by frost, but the stools survive and in spring new shoots are pushed up in abundance. It is a native of China and Japan and has been in cultivation here many years, but it is not generally known in gardens.

New Chrysanthemums.—A dozen new sorts of Chrysanthemums were certificated by the National Chrysanthemum Society and the Royal Horticultural Society. There is every promise of an exceptionally good display of these plants in England this year, the peculiar character of the season having been favorable to them. I am informed, too, that the number of new seedlings that are being tested by English growers this year is far in excess of anything ever done before. Those certificated were: Boule d'Or, large incurved, amber yellow, the inside of the florets chestnut red; Lady Esther Smith, large Japanese, with long, broad pure white florets; Lady Randolph, large Japanese, somewhat globular, the florets purplish amaranth; Lago Maggiore, large Japanese, with long, broad reflexed golden-yellow florets; Madame A. de Lacvivier, Japanese incurved, crimson, with yellow reverse; Madame M. Massé, Japanese, early, rosy mauve, golden centre; Monsieur C. Molin, large Japanese, with broad yellow florets tinged with carmine; Phœbus, yellow Japanese; President Armand, Japanese incurved, chestnut, with yellow reverse; Pride of Madford, large Japanese, purple, paler reverse; T. B. Haywood, large Japanese, white, of good substance (of Australian origin); Yellow Gem, a Pompon variety, with yellow fimbriated florets.

London. *W. Watson.*

New or Little-known Plants.

Fothergilla Gardeni.

THE flora of the southern Appalachian Mountains is distinguished by a number of monotypic shrubs which are generally exceedingly rare and of local distribution; among them is Fothergilla, a member of the Witch Hazel family, distinguished by its short terminal, ament-like, pedunculate clusters of flowers, which are sessile and apetalous, and open in early spring from the axils of scale-like, tomentose, deciduous bracts. The calyx is campanulate, adnate below to the ovary and repandly five to seven dentate; on its margin are inserted in a single series about twenty-five long, straight, clavate white filaments bearing small yellow anthers, and rather longer than the two, or rarely three, slender spreading styles. The fruit is a two-lobed, two-valved, hoary tomentose, two-seeded capsule resembling that of the Witch Hazel in size and shape, and, like that of the Witch Hazel, ejecting the seeds violently on opening.

Fothergilla Gardeni (see illustration on page 445 of this issue), the only species, is a shrub of compact habit, from three to five feet tall, with numerous stout stems, large ovate pointed, light red, pubescent buds, and alternate, obovate, petiolate, deciduous leaves, rounded or acute and coarsely serrate at the apex, about three inches long, two or three inches broad, thick and firm, dark dull green on the upper surface, and pale and glaucous on the lower surface, which is more or less pubescent, especially along the midribs and numerous conspicuous primary veins. In early spring, before the appearance of the leaves, the flowers open on the ends of all the branches, covering the plant with brush-like masses of the long white stamens, which are the only showy parts of the flower, and make it at this time a most conspicuous and beautiful object.

Fothergilla Gardeni grows naturally on the borders of swamps and streams on the Carolina coast and in the foot-hill region of the southern Alleghanies. Nowhere common, it has been collected in recent years near Wilmington and at Salem, North Carolina, at Cæsar's Head, in the Blue Ridge, South Carolina, and by Dr. Mohr in the valley of the Tennessee River near Florence, Alabama; near Cullmann, Alabama, and at Prattville, Autauga County, Alabama.

Fothergilla Gardeni was introduced into English gardens one hundred and thirty years ago, and, judging by the number of figures that were published of it in Europe toward the end of the last and at the beginning of the present century, it must at that time have been a well-known and favorite inhabitant of gardens from which it has now almost entirely disappeared, in spite of the fact that few shrubs present a more curious and beautiful effect than Fothergilla when it is covered with flowers. Its habit is excellent, too, and its foliage is abundant and rich in color.

In the Arnold Arboretum Fothergilla is perfectly hardy, and flowers profusely every year, although it has not ripened its fruit. The flowering branch in our illustration is from a plant that has been growing for many years in the Arboretum. The fruiting branch is from the nursery of Mr. Thomas Meehan, of Germantown, Philadelphia, where Fothergilla ripens its seeds during the month of July.

C. S. S.

Plant Notes.

Liquidambar styraciflua.—The American Liquidamber, or Sweet Gum, is one of the best of our large native trees for ornamental planting, and yet, although Downing commended it fifty years ago as one of the most beautiful of trees at every stage of its growth and during every season of the year, comparatively few of these trees, even now, are planted, and to far the greatest number of those who plant trees it is absolutely unknown. In the course of his enthusiastic description of the Sweet Gum, Downing says: "During the summer months it preserves unsoiled that dark glossy freshness which is so delightful to the eye, while the singularly regular palmate form of the leaves readily distinguishes it from the common trees of a plantation. But in autumn it assumes its gayest livery and is decked in colors almost too bright and vivid for foliage, and forms one of the most brilliant objects in American scenery at that period of the year. The prevailing tint of the foliage is then a deep purplish red, unlike any symptom of decay, and this is sometimes varied by a shade deeper or lighter, while occasionally an orange tint is assumed. When planted in the neighborhood of our fine Maples, Ashes and other trees remarkable for their autumnal coloring, the effect in a warm dry autumn is almost magical." He adds elsewhere that the tree, from the character of its outline, which is not specially picturesque, unites and harmonizes with nearly all other trees to make a good composition. In its general form it resembles somewhat a slender Sugar Maple, although its leaves are much more glossy than those of any Maple. Its somewhat narrow and pyramidal shape and its adaptedness to various soils and rapidity of growth make it useful for street-planting. The branches are rather short in proportion to the height of the tree, so that when it is young the head is rather sharply pyramidal. The broad star-shaped leaves, three or four inches across, are pleasantly fragrant when bruised, and the leafless branches are interesting in winter on account of the broad corky wings. It attains its greatest size in the Mississippi basin, where it is sometimes a hundred and fifty feet high, but it becomes a large tree in this latitude. It ranges naturally from Connecticut to Guatemala, but is somewhat tender on the New England coast. Besides the Sweet Gum and Liquidamber, the tree is known in different parts of the country as the Bilsted, the Red Gum

and the Star-leaved Gum. There are, at least, two other species of Liquidambar besides the American tree; one of these in Asia Minor, L. orientalis, furnishes the liquid storax of commerce; another one, L. Formosana, in southern and eastern China, and the island of Formosa, is the tree whose wood is largely used in making the chests in which tea is exported.

Acer cissifolium.—The autumn foliage of this Japanese Negundo is hardly excelled in beauty by that of any other exotic tree. The leaves at the ends of the branches turn first to a bright scarlet while the others are orange-yellow, and the contrast makes an effect which is interesting, and almost unique. The tree is perfectly hardy; it grows compactly into a round-headed form, with clean slender leaves of a light pleasing color, and since the young shoots continue to grow long after most trees have finished their growth for the year, the delicate color of the foliage at the extremity of the branches gives it a fresh and distinct appearance at midsummer. It grows rapidly, too, and does not seem to have the constitutional weakness from which many of the Japanese Maples suffer here, so that it is altogether one of the most satisfactory of the Japanese trees which have been tried in our climate. It ought to be more common, for it has been fruiting in this country for many years, and it can be used to advantage wherever comparatively small trees are desirable. Its rather formal habit commends it especially as a single specimen on a small lawn.

Ceratostigma plumbaginoides (Plumbago Larpentæ).—Covering the ground like an intensely blue carpet, this fine Chinese Leadwort is a beautiful object during the late autumn months. In habit it is almost creeping, but bushy and leafy, growing to a height of six or eight inches, and producing in dense terminal heads flowers of as deep a blue as can be found anywhere in the vegetable kingdom. The leaves are obovate, tapering to the base, sessile, with a hairy edge, and at this season they turn to bright crimson and orange. The plant is very floriferous and an admirable one for dry and sunny positions in rockeries and borders, and, although it starts late, it is useful for covering dry banks in places where grass will not thrive. It is easily propagated by seeds sown in a frame early in spring, or by means of division or layering of the half-woody branches, which, if covered with soil, root near the base.

Cultural Department.

Cattleya labiata.

VERY few Orchids in cultivation have come so near fulfilling all the claims made for them by introducers as this one, the type plant on which the genus was founded by Lindley soon after its first introduction in 1818. Its subsequent history, too, has added much to the interest it originally excited. Its total disappearance from the original districts from which it was introduced, the casual arrival of a few plants at various times from obscure sources, the futile efforts so long made to reintroduce it, and lastly its reappearance under the name of Cattleya Warocqueana from a province nearly five hundred miles distant from Rio, where it was first seen, all seem more like products of imagination than like reality. The supply of plants seems almost inexhaustible, judging from the number that have already found their way into cultivation from Pernambuco during the last four or five years. The benefits to horticulture are scarcely to be calculated, as this Cattleya flowers at a time when so few other plants are in bloom. The Orchid-houses now are transformed into a mass of gorgeous coloring that is not excelled by the display in early spring, when the other forms of C. labiata are at their best.

To the cultivator, perhaps, the most pleasing fact connected with this Cattleya is the ease with which it can be grown. Many other Cattleyas are of easy culture, but the best cultural skill has failed to keep them in collections for an extended period. C. labiata seems to furnish an exception to this rule. At the time of its reintroduction there were plants in gardens that had been cultivated for twenty-five years, according to the record, and possibly some of the first plants introduced are still living. They had no storehouse in the way of back bulbs made in their native country to draw upon for their supply of vigor, but were growing and flowering freely under the system of treatment that is now adopted by the best growers. We have thus the assurance that C. labiata is not only a free grower, but has the crowning merit of longevity. It may now be bought as cheaply as any other Cattleya, while five years ago it was worth its weight in gold and the supply was meagre. It was formerly used to a necessarily limited extent for hybridizing purposes, but wherever it was so used its influence was potent for good. Some of the best crosses ever made have this plant for one of the parents. All who wish can now have a plentiful supply and make a free use of it, and the result will surely be for the common good.

We now have more of these Cattleyas than of any other sort. Their journey from their native place was a severe ordeal, since they traveled from Brazil to London, and thence to New York to the salesrooms. Many looked almost hopeless, but heat and a genial moisture works wonders under our clear skies, and pieces, with not more than two bulbs when they came, are now flowering, in many cases giving four flowers from the one bulb. Established plants frequently produce five flowers on one stem, and I have seen, in one instance, six flowers on the stem, all of good size and high color.

There is as much variation among plants of this variety as among any other, in that no two are alike, and each flower has its distinctive characters. As yet there is a very small percentage of white forms, and they are evidently not so numerous as we were led at first to believe they would be. Neither is there such radical variation as among plants of Cattleya Trianæ and other kinds, but there is a much smaller number of inferior varieties than in any other Cattleya, and I have yet to see one variety that has not some merit.

This Cattleya belongs to the section that flowers directly on the completion of the current year's growth. There is no apparent rest before flowering, and but a slight cessation after, for we find that the most active rooting season is just after the strain of flowering. The plants at once recuperate themselves, so it would be folly to dry them at the roots at this time. In newly established pieces there is always a tendency to make a growth out of season. We have many now that are doing so, but after a year or two this tendency disappears, and they get into a regular habit and adapt themselves to our seasons, which are different from their own in Brazil. There no rain falls for six months, but the night dews must be heavy, or the plants would not be found there. The cultivation of this Cattleya is similar to that required by other members of the same group. After repeated trials we have given up using moss with the fern-root for potting material. There is no advantage from its use, and it too often brings in snails and slugs. It causes the other portion of the compost to sour and hastens its decay, and finally causes the decay of the roots of the plant. If good fibrous Osmunda-roots are used as soon as possible after they are gathered, this potting material should keep in sound condition four or five years. The roots will remain healthy if perforated pots or pans are used. We have given up the use of baskets for Cattleyas. In the first place they are costly if made of cedar-wood; and to take out a plant that is well and firmly fixed in a wooden basket causes so serious a check that it often takes a season or two for the plant to recover. Perforated pans can be easily obtained, and cost about as many cents as the plants are worth dollars. They are readily broken when it is necessary to give a plant a shift without any material damage to the roots if the plant is well watered a day or two before. If shifted at the proper time, when root-action is commencing, there will be no shrinkage of the bulbs whatever. For the small-growing Cattleyas and Lælias, such as C. Walkeriana, L. præstans and L. Dayana, we take a square block of fern-root as it is sawn off and peg the small pieces on, suspending this in the usual way. It is amazing how they thrive. C. Walkeriana has made bulbs that far exceed in size any made in its native country, and is now showing for flower freely. To the close observer there is much to be learned in matters of detail; while these are often small in themselves, they go to make up the difference between failure and success. There is an all-absorbing interest in the purchase of dried-up pieces as they come from their native woods and in watching them expand as heat and moisture are supplied. But the greatest interest is at flowering time, when the buds are eagerly watched as they develop. They are oftentimes white until after the first day of opening, when the tinge of pink is almost sure to appear, for true white ones are very rare. Some of these rare white flowers are described as being so beautiful that the possibility of securing flowers of this color is all the more fascinating.

South Lancaster, Mass. *E. O. Orpet.*

The Germination of Nuts.

IT is a very common notion in the north that nuts—butternuts, for instance—will not grow until they are frozen, and that this freezing is necessary to open their shells. A moment's thought ought to recall the fact that many of the hardest-shelled nuts are native to regions where freezing is unknown. As for our northern nuts, they drop with or before the foliage of the trees which bear them; and in the still air of the forest or grove the snow lies level, while the dead leaves, with the snow, constitute, even here in northern Vermont and adjoining Canada, one of the most perfectly frost-proof coverings, habitually made use of in our gardens to protect our half-hardy and tender plants in winter.

Some—indeed, I think many, if not all our northern nuts—retain their vitality, under favorable conditions, for many years. Having last spring a call for a lot of young Butternut-trees, I planted a considerable quantity of nuts which had been kept in a shed-loft for four or five years. Every nut vegetated, and they have all made a growth of from ten to twelve inches during the season. These nuts have unquestionably been subjected to a temperature far below zero every winter since they were gathered, but none of their shells were cracked or loosened. I do not think their vitality would have been preserved had this occurred.

So far as my observation and experience have yet extended, in reference to the vitality of nuts (and these cover a considerable extent of territory—from Canada to Tennessee), they rarely vegetate extensively near the trees from which they fall. Perhaps this is chiefly due to the activity of boys and squirrels in harvesting the crop. Where the trees stand closely there may also be a lack of sun-force to start germination. If it were not for its rough strong shell the butternut would have a very extensive sale, for in quality it is decidedly superior to the so-called English walnut, and it will endure a much colder climate.

Newport, Vt. *T. H. Hoskins.*

Trenching in Vegetable Garden.

INDEPENDENTLY of manures garden soils may be improved in many ways, and at no season of the year can these improvements be better carried out in this section than the last part of October and first half of November. The principal plan for making soils better is to pulverize them deeply by digging and trenching. This makes finer particles and a greater surface for the rootlets of plants to feed upon; it enables them more easily to penetrate in every direction in search of food and promotes a free circulation of air and water. There are few gardens which would not be vastly benefited by such trenching, and especially is this true of gardens which have been under cultivation for thirty or forty years, or even more. In Great Britain, where many gardens have been cultivated a century, and others much longer, it would not be possible to secure the best crops by merely gorging the land with manure year after year. I have in mind a vegetable garden in England which has been constantly cropped for over two hundred years, and still produces vegetables of the very highest quality.

Digging and trenching render the humidity of the soil more uniform, so that the plant-food which is held in solution by water is made available for all the roots. Fertilizers are useless unless they are dissolved, and thus prepared to be taken up into the circulation of the plant. During the spring and early summer months soils need to be warm to stimulate root-action and to help the decomposition of manures, and deep digging and opening helps in this way.

In trenching, care must be taken to regulate the work according to the depth of soil. If trenched too deep the best soil is buried under the crude infertile subsoil, in which vegetation will not flourish. We endeavor to trench a portion of our vegetable garden each fall, and usually go three spits deep, this being as deep as the roots of most of the plants penetrate, but for Parsnips and other root crops it is best to go deeper if the quality of soil will permit. In some soils there is less necessity for trenching than in others, but where the ground has been in constant cultivation for half a century, as in our case, such an operation cannot be dispensed with if crops of high quality are desired.

When trenching, a good dressing of well-rotted manure should be worked in if the ground is of a heavy clayey consistency, as much of ours is. Sharp sand, wood-ashes, lime, lime rubbish or broken shells all help to break its tenacity and make it work more pleasantly. Light, sandy and gravelly soils are naturally warmer than stiff and heavy soils, and while they do not produce as fine a quality of crops, they are useful for early crops, which mature more quickly than on heavier land. These light soils are not readily benefited by manures, as the finer particles are washed away by the rains; they are improved by the addition of strong loam, which should be applied in sufficient quantity to form a compost which will retain moisture enough for garden crops.

Generally speaking, a moderately tenacious soil is the best and most productive, but as earlier crops can be had from a lighter kind it is advantageous to have both in a garden. Where the ground is very stiff and clayey, if it can be thrown up rough cast before winter, the frost will help to pulverize it and make it work better another season.

Taunton, Mass. *W. N. Craig.*

Correspondence.

Frosts and Fruits.

To the Editor of Garden and Forest:

Sir,—It is very common to err in estimating the damage done to a fruit crop by late frosts in the spring. The present year affords a remarkable illustration of this fact. The reports gathered from various points in New York, Pennsylvania, Ohio, West Virginia and Maryland immediately after the severe frosts of the second week of May, indicated a very general destruction of all the large and small fruits, and every kind of fruit which I carefully examined in the western part of Pennsylvania was actually blackened—apples and pears being then as large as peas. In fact, the cold was so severe and the time of it so unfortunate that even the new growth of three or four inches on the Oaks was entirely blackened in certain places. Gardeners generally had their Tomato plants set out, and their early Beans had vegetated; these were totally destroyed, and in the rush for more seeds the local stores were exhausted of their supply. All this made it natural to prophesy that fruit and certain vegetables would be scarce and high-priced.

Now, having lived through the season, we can look backward and observe that this has been a year of plenty. There seems to be no county or state where apples are grown that reports a want of this staple fruit, and the prevailing wholesale price for the best winter apples is no higher than it was during the harvest of the great crop of 1893. In this valley, among the mountains of central Pennsylvania, orchards on neighboring farms were very differently affected by the frosts—in one case resulting in an entire failure of fruit; in the other, a very large crop of fine fruit. This singling out of certain orchards seems to have been without apparent reason. Orchards extending up the mountain sides yielded full crops on the trees of the upper portions and generally failed below. The College Apple orchard of five hundred trees was in full bearing, and being an experimental orchard it contains about seventy-five varieties of apples. No variety seemed to be severely tried by the frosts, but all matured as full a crop as they are accustomed to do. Grapes were also very irregularly affected by these frosts of May, but, in general, more severely than the large fruits. In small vineyards, where the damage was least, some varieties exhibited greater resistance than others. Concord, Delaware and Worden proved the hardiest.

Pennsylvania Experiment Station. *George C. Butz.*

Doubling of Flowers.

To the Editor of Garden and Forest:

Sir,—I venture to offer the following note in view of some allusions to the manner in which flowers become double. The phenomena known as doubling, a frequent occurrence in the garden or greenhouse, is generally a transformation of the stamens to petals or sepals or a replacement of the stamens by the latter organs. The sexual reproductive system in plants is a modification of the vegetative system, and gradual transitions exist between the sepals and the pistil, as is plainly seen in the flower of a Water-lily. It is also seen in the Canna, the showy portion of which is composed of transformed stamens, which in many cases still persist to the petal-like organs. It should be remembered also that in the evolution of the reproductive system the pistil has been more widely modified from the original leaf-form than other organs, the stamens less, the petals still less, and the sepals and bracts comparatively little. It is important also to note that a closer morphological relation exists between the leaves and the perianth, and between the leaves and stamens, than between the stamens and pistils. It is not difficult, therefore, to see, because of the close interrelationship of the vegetative and reproductive organs, that if the one is highly forced and made variable, the other must necessarily be affected.

The tendency to doubling, according to Lindley and other horticulturists, is in proportion to the number of stamens and pistils in the flower, and the conditions which bring on doubling are rapid forcing and high cultivation or fertilization. In other words, whenever, from any cause, an excessive development of the vegetative system results, then doubling is likely to occur. A plethoric condition of the plant induces it, and a gardener recently told me he believed any flower could be made to double under continued high cultivation.

Another set of facts indicates that doubling is produced by overnutrition. Plants that produce double flowers in rich soil often produce single ones when changed to poor soil, and, furthermore, toward the end of the season, when the vigor of the plant is waning, double Carnations, Roses, Poppies and other flowers often become single.

We can now see why rapid forcing and high cultivation tend to produce double flowers. The plant in that condition is directing its energies toward an increase of its vegetative system, and its vegetative activity is so powerful that it extends to the reproductive system, and the essential organs of reproduction are replaced by sepals or petals, which are more closely allied to the vegetative organs. The stamens are more often affected because, as has been pointed out, they have a closer morphological relation to the vegetative organs than have the pistils. When this vegetative exuberance is carried a step further the pistil may be replaced by petals.

Cornell University. *G. Harold Powell.*

Exhibitions.

Forestry at Atlanta.

ALTHOUGH not so large as that made two years ago at Chicago, the forestry exhibit at Atlanta is certainly the most instructive and, from an educational point of view, the most valuable that has yet appeared at any of the great exhibitions held in this country. It has been arranged under the general direction of Mr. B. E. Fernow, Chief of the Division of Forestry of the Department of Agriculture, who made the scheme of the exhibit and prepared the plans for the attractive rustic buildings in which he has installed it. The group arranged by the Division of Forestry is the most interesting and valuable feature of the exhibit. More than two hundred and eighty species of the southern trees are here represented by dried branches, showing flowers, foliage and fruit, and by specimens of wood and bark. These specimens are accompanied by maps of North America showing the distribution of the species. The distribution of the twenty chief timber trees of the south is shown on much larger maps, accompanied by sections of the trunks of full-grown trees, pieces of the wood polished and unpolished, the whole being surrounded by large frames made from the bark of the species. The methods and results of the timber tests now carried on by the Department are shown by pieces of the wood used to determine their strength and resistance to pressure in various directions, as well as by the testing machine itself. Three maps in high relief show an imaginary southern farm ruined by erosion following excessive deforestation, and the same farm improved by partial and by sufficient forestation with its increased fertility. These models, which are well considered and effectually carried out, make one of the most instructive features in the whole exhibit, and several rural economists who have seen them declare that they should be reproduced and a copy deposited as an object-lesson in some accessible place in every county town throughout the south.

For the exhibit made by the Department of Agriculture the jury has recommended a gold medal, the highest award at their disposal; and to Mr. B. E. Fernow, "for his conspicuous skill and devotion in preparing and installing the exhibit," a special individual diploma, similar diplomas being recommended for his assistants, Mr. George B. Sudworth, of Washington, and Dr. Charles Mohr, of Mobile.

Mr. J. G. Schuler, who is a German turpentine manufacturer, of Edgewood, Louisiana, exhibits his new process for obtaining turpentine from Pine-trees. A modification of the French method, it has the advantage of reducing considerably the danger which "boxed" trees are subjected to by fire, while the quality of the product is improved and the individual tree is less injured than it is by the method now generally adopted in the United States. The jury recommended a silver medal to Mr. Schuler for his invention, which either in its present form or with some further modifications seems destined to add millions of dollars to the productive value of the Pine forests of the southern states.

An admirable collection of planks of selected timber-trees of North Carolina, accompanied by photographs, is exhibited by the Geological Survey of North Carolina, which receives a silver medal for its exhibit.

The timber of one hundred and fifty indigenous trees of Georgia, each log being accompanied by a map showing the distribution of the species in the state, is exhibited by the Geological Survey of Georgia. This collection, which is the fullest of its kind here, receives a silver medal, while a special individual diploma is given to Mr. John K. Small, of Columbia College, "for the intelligence, zeal and industry which he has displayed in collecting it" during the few months allowed him for the purpose.

One of the most instructive exhibits here is that of the Mobile & Ohio Railroad, consisting of a collection of planks and trunk sections of twenty-six of the most important trees of southern Alabama and Mississippi, together with six original maps, prepared by Dr. Charles Mohr, of Mobile. These show the distribution of the principal timber-trees of Alabama, the chief centres of lumber manufacture in that state, and the statistics of the yield of forest products on the line of this railroad. These maps are the most important original cartographic work in the whole Forestry Exhibit, and Dr. Mohr is especially commended for them by his associates on the jury.

The method of producing naval stores, with the tools used in the process, a model of a turpentine-still and samples of naval stores of all kinds are exhibited in a most instructive manner by the Savannah Board of Trade, although, unfortunately, this exhibit is not in the Forestry Building, and may, therefore, be overlooked by special students of the subject, who would hardly expect to find it in a gallery of one of the other buildings.

Several individual exhibits are instructive, especially that of H. W. Russell, of Huntsville, and Von Beren & Company, of Evansville, Indiana, who show logs and billets of hickory and the application of this wood in the manufacture of tool handles and wagon and wheel stock; that of the Western Carolina Lumber Company, of Asheville, North Carolina, who show lumber of Liriodendron and its application to the interior finish of houses; the Hilton & Dodge Lumber Company, of Simonsville, Georgia, who exhibit the wood of Taxodium and its application in the arts; the Missouri Lumber Company, of Granden, Missouri, who show beautiful specimens of the Short-leaved Pine (Pinus echinata), in various stages of manufacture and its application in the arts; the Nininger-Gregg Company, of Curly, Alabama, who show logs of Red Cedar (Juniperus Virginiana), and its application in the manufacture of wooden-ware; the Atlanta Lumber Company, of Atlanta, Georgia, who show the Long-leaved Pine in its various stages of manufacture and its application in the arts and in construction.

The beauty of the building is heightened by photographic transparencies of important timber-trees placed in the windows, and exhibited by the Caldwell Lumber Company, of Lenoir, North Carolina.

It is, of course, impossible to mention in an article of this character all the exhibits, but enough, perhaps, has been said to show that forestry, in its educational aspects, has never been shown so well before in this country. In closing its report to the Commission of Awards, the special Jury in Class A (Forestry) takes occasion to say:

"Maps and statistics, forming parts of exhibits submitted to the Jury in Forestry, furnish independent evidence of the exceptionally rapid and improvident destruction of the magnificent deciduous and coniferous forests of the south. To this evidence, substantiated as it is by the personal knowledge of the Jury, we desire to call special attention, as well as to the remedy for the condition it discloses. An analogous condition in nearly all other parts of the country is within the experience of the members of this Jury, which has extended to an examination of the forests of every state and territory in the Union. In view of the serious and peculiar dangers which, in our judgment, threaten agriculture and commerce from the destruction of forests throughout the country, and the immediate need for the application of the remedies, we are impelled to lay the following brief statement of the latter before you.

"A fundamental cure for these evils lies in a general knowledge of the nature of forestry, and a recognition by the people of the fact that it offers a practical, efficient and available means, in the United States, of harvesting a forest crop without injury to the forest. But the formation of public opinion is necessarily slow, and in this instance action is required at once. The first step, therefore, should consist of legislation to favor the protection of forests throughout the United States, and more especially for the permanent preservation and protection of forest lands about the headwaters of streams, much

of which in the western mountain ranges still remains, and should forever continue, in the possession of the Government."

The report is signed by Charles S. Sargent, Chairman; Charles Mohr, William M. Canby, Henry Trimble, John Berkinbine and Gifford Pinchot, Secretary.

Notes.

Miss Frances Prince, 17 Jay street, Boston, resumed her classes in Botany on the first of November. The Winter Aspect of Trees, the Ferns of New England, the Evolution of Plant Life, Weeds and Wayside Plants are four subjects upon which ten or more lessons will be given.

One of our common Asters is A. undulatus, and it usually grows on dry, hungry land, but when it is planted in rich, deep soil it will reach a height of four feet, spreading into a fine bushy shape, and at this late season it still bears abundantly its medium-sized heads with light blue rays and continues to make a show when most other flowers are gone.

The first shipments of the new crop of almonds reached this city from California about two weeks ago. About fifty car-loads is the estimated crop of these nuts for the entire state this year, and, of course, only a portion of this amount will come to this market. New-crop English walnuts are also here from the same state, and specially thin-shelled ones, known as Paper-shell walnuts, are said to be superior to the French Grenoble walnuts. The new Italian and French walnuts have also reached us, with new Tarragona and Ivica almonds from Spain, Princess Paper-shell from France, and shelled Jordan almonds from Spain.

In connection with a lecture last week in Plainfield, New Jersey, on the geographical distribution of trees, by Mr. John Gifford, editor of *The Forester*, there was an interesting exhibition of some work by the pupils of the Dalziel Manual Training School. This was a collection of various ornamental articles, such as vases and the like, made from twenty different species of trees growing in the neighborhood of the school. Most of the articles were highly finished and polished, although on some of them the bark was allowed to remain on certain portions, and in every case the name of the tree which furnished the wood was written. The leaf, flower and fruit of the trees were also shown, effectively mounted.

We have taken occasion in former years to commend the intelligent zeal of the Linnæan Club, of Jamaica, Long Island, an organization whose activity is directed to many useful purposes besides the study of botany and other natural sciences. It is in effect a village improvement society, and not only encourages the cultivation of flowers, but the preservation of our native herbs, shrubs and trees. The fifth annual flower show of this club will be held in the Town Hall on the 7th and 8th of November, and, as usual, premiums are offered for herbariums of native plants, for properly named dried grasses and seed-vessels suitable for winter bouquets and the like. Last year the exhibits in these classes by the pupils of the public schools were of unusual interest, some of the best having been made by children under twelve years of age.

The best vegetable-stands in the large markets are, perhaps, even more showy now than in midsummer. All the summer vegetables are still seen, for the last sugar corn and tomatoes may yet be had, with new Brussels sprouts, leeks, salsify, celeriac and kohl-rabi, and new peas, beans, okra and egg-plants from southern gardens. Striking color-effects are produced by the creamy heads of cauliflower in their green foliage, dull red beets, clear yellow carrots, white parsnips, deep orange pumpkins and bright radishes, relieved by the many shades of their fresh stems or leaves. Besides watercress, many green lettuces and the bronzy purple kale, there are now coming into market the new crop of dried thyme, sage and sweet marjoram, while the stalls, gayly festooned with strings of small red peppers, are aromatic with fresh mint, tarragon and other fragrant herbs.

Twenty new Chrysanthemums were inspected on Saturday in this city by an awarding committee of the New York Florists' Club representing the National Chrysanthemum Society. The plants certificated were the following: Mrs. Perrin, shown by E. G. Hill, of Richmond, Indiana; flower loosely incurved, deep rose-pink, silvery reverse, unsurpassed in color and first-rate in stem and foliage. Marion Cleveland, shown by T. H. Spaulding, Orange, New Jersey; flower incurved Japanese, large, lemon-yellow, shading to light canary, a new color in this class. Miss Agnes Louise Dalkson, shown by M. Hansen, New Durham, New Jersey; flower loosely incurved Japanese, a sport from Ivory and identical in form and foliage, but of a clear pink color. Baltimore Belle, shown by John N. May, Summit, New Jersey; flower incurved Japanese, white, with a faint blush, an improvement on the Mrs. H. McK. Twomley. The other varieties were all good, and some of them quite distinct, like Mr. May's Infatuation, a half-tasseled cream-white flower; but they all failed to reach the highest standard in some requirement, or were not considered superior to varieties already in commerce.

Mr. T. V. Munson writes to the *Farm and Ranch* that in a large portion of eastern Texas, where there is considerable moisture, varieties and hybrids of Vitis vinifera have been rendered almost useless by the black rot, in spite of five applications of the Bordeaux mixture. Some native varieties, like Ives, Perkins and Norton, have borne good crops with no treatment. Champion, Moore's Early, Woodruff, Worden, Agawam, Concord, Goethe and many others were saved with two sprayings. Moore's Diamond, Brighton, Green Mountain, Niagara, Empire State and others yielded a fair crop when sprayed once just before flowering, again when the young grapes were the size of pigeon-shot, and a third time nine or ten days later. Mr. Munson says that in south-western France the grape crop has been nearly destroyed by the black rot this season, which was characterized by excessive rains during spring and summer. The disease was so virulent that spraying with the copper compounds did not seem to check it. It is the difficulty of overcoming the rot and mildew which prevents the successful cultivation of the Vinifera varieties in most parts of this country, although in the arid regions of western Texas they succeed quite well. The power of resistance which different varieties have to the black rot is certainly an important point to be considered by all who are planting vineyards.

The Norway Maple is an admirable street-tree in our eastern cities, and although it is sometimes disfigured in summer by thrips, especially farther inland, it appears to flourish as well near the sea as most of our own Maples. It also holds its leaves later than our native sorts, and, unlike many other European trees, it has the merit of coloring beautifully in the autumn. For some years we have observed in a neighboring city a row of these trees which are about thirty years old, in first-rate health, and just now they are making a striking display. On one of them nearly every leaf is colored throughout with the same tint, a light lemon-yellow, and when the sun shines through the foliage it is singularly beautiful. Next to it is a tree which shows hardly any yellow whatever, although on examination most of the leaves are seen to have a narrow strip of yellow along the prominent veins, the remainder being a light crimson. For three successive seasons, at least, these trees have each one shown this difference of color, a fact which goes to justify the belief that individual trees of different species have a constitutional tendency to turn to the same color every year. The foliage of other trees in the row is yellow and scarlet, with these colors distributed in various proportions, most of the leaves being yellow in the main, but with occasional blotches and splashes of crimson, margined with a zone of crimson.

During the past week 16,000 barrels and boxes of Jamaica oranges were sold here, and small lots of Havana oranges have already come to this port. Mexican oranges are now reaching Chicago and other western markets. It is said that boxes are being shipped to Mexico from Bangor, Maine, and the oranges are attractively packed in these in Florida style. The first of the new crop Sicily lemons reached here last Friday and will be sold at auction to-day (Wednesday). High grade Majori lemons are quoted at $11.00 a box, wholesale, but lemons which command this price are scarce. A more general wholesale rate is $5.00, ranging to $3.00, and fruit of the latter grade is sold on the street-stands for one cent each. The quantity of Almeria grapes expected to reach this country this season is variously estimated at 90,000 to 150,000 barrels. Their keeping qualities are exceptionally poor. Prices at recent sales ranged from $1.37½ to $9.25 a barrel. Grapes comprised nearly all of the seventeen car-loads of California fruit sold here last week, Black Moroccos being in greatest quantity. Some belated peaches from the Hudson River district and Connecticut are still in market, but the demand is slight and prices correspondingly low. A few Delaware and Niagara grapes are still occasionally seen here among offerings of Concords. The stock of the latter will be exhausted before Thanksgiving. Catawbas are said to be of excellent quality this year with respect to color, texture and flavor.